Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20054

In the Matter of	)	
	)	
Reallocation of Television Channels	)	ET Docket No. 97-157
60-69, the 746-806 MHz Band	)	

REPLY COMMENTS OF MOTOROLA

Motorola hereby replies to the comments submitted in response to the FCC's *Notice of Proposed Rule Making* in the above captioned proceeding.[1] As further described below, Motorola continues to state its strong support for the reallocation of 746-806 MHz (UHF TV channels 60-69) for public safety and commercial uses and, specifically, a public safety sub-allocation at 764-776/794-806 MHz (UHF-TV channels 63, 64, 68, and 69).

Overview

More than 60 parties filed comments in response to the FCC's *Notice*. Those supporting the reallocation note that the recently adopted *Budget Act of 1997*[2] mandates that the FCC proceed with the reallocation essentially as proposed.[3] Given this new law, the majority of the comments focused on the impact of the reallocation upon existing and future users of this

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[1] *In the Matter of Reallocation of Television Channels 60-69, the 746-806 MHz Band,* ET Docket No. 97-157, FCC 97-245 (released July 10, 1997) ("*Notice*" or "*NPRM*").

[2] Balanced Budget Act of 1997, P.L. 105-33. (1997) (*Budget Act of 1997*).

[3] *See, e.g.,* Comments of the Land Mobile Communications Council (LMCC) at 4, Comments of APCO at 2, Comments of the National Telecommunications and Information Administration (NTIA) at 3, and Comments of the Personal Communications Industry Association (PCIA) at 2.

spectrum during the regulatory transition period and on the technical parameters of the allocation. The comments filed by the Association for Maximum Service Television, Inc. (MSTV) and the National Association of Broadcasters (NAB) argue that public safety should be allocated a contiguous block of 24 MHz consisting of channels 66-69 instead of the 764-776/794-806 MHz bands (TV channels 63, 64, 68 and 69) as proposed by the FCC.

As noted in its opening comments, Motorola supports the reallocation of the UHF-TV channels 60-69 for public safety and commercial non-broadcast operations. This action is necessary to begin meeting the communications needs of the public safety community as detailed in the Final Report of the Public Safety Wireless Advisory Committee.[4] Furthermore, Motorola opposes the efforts of the NAB and MSTV to isolate the public safety allocation to the spectrum now occupied by channels 66-69. Doing so would result in increased equipment and system implementation costs for public safety users and reduced design flexibility for manufacturers when compared to the Commission's original proposal of allocating TV channels 63, 64, 68 and 69 for public safety.

The Record and the Law Support the Reallocation of the 746-806 MHz Band for Public Safety and Commercial Operations.

The FCC's *Notice* predates the passage of the *Budget Act of 1997* by several months and, therefore, does not consider the Congressional mandate that the FCC allocate 24 megahertz of

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[4] *See PSWAC, Final Report of the Public Safety Wireless Advisory Committee to the Federal Communications Commission, Reed E. Hundt, Chairman, and the National Telecommunications and Information Administration, Larry Irving, Assistant Secretary of Commerce for Communications and Information* (Final Report) (1996).

spectrum between 746 MHz and 806 MHz for public safety use no later than January 1, 1998. As noted by APCO[5], the basic question asked by the *Notice, i.e.,* whether the FCC should allocate 24 MHz of spectrum for public safety in this band, already has been answered by Congress and comments seeking to revisit the amount of spectrum to be reallocated are misguided.[6] Given its status as law, there is no need for the FCC to debate further whether this reallocation serves the public interest and, thus, the Commission should proceed expeditiously to enact this legislation by the January 1 deadline.

Congress has also directed the Commission to reallocate the remaining 36 MHz of spectrum in the 746-806 MHz band for undefined commercial uses by the same January 1, 1998, deadline and to commence competitive bidding for that spectrum on or after January 1, 2001.[7] An issue raised in this proceeding is whether this commercial allocation should allow flexible uses including fixed, mobile and broadcast services. In its opening comments, Motorola noted that the disparity of technical operations between video broadcast services and the fixed/mobile services (*i.e.,* higher power versus lower power, single transmitting site versus wide area coverage, one-way versus two way operation, wide-band versus relatively narrow channels) will most likely

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[5] Comments of APCO at 2.

[6] Some broadcast interests, particularly those affiliated with the low power television (LPTV) and translator services, filed comments questioning the need to allocate 24 MHz of spectrum for public safety in all areas of the country. *See, e.g.,* Comments of the National Translator Association at 2, Comments of the Community Broadcasters Association at 2.

[7] *Budget Act of 1997,* P.L. 105-33, §§ 3003, 3004.

result in reduced spectrum efficiency and would negatively impact the spectrum available to both the public safety and commercial land mobile services in specific markets.[8]

Other parties expressed similar concerns over the flexible use proposal and questioned whether this would result in the most efficient use of the spectrum. CTIA, for example, notes that "[t]he absence of use allocation (or allocation so broad as to constitute an absence of allocation) will cause needless uncertainty for potential bidders, financial investors, and equipment manufacturers as to the initial use of the band."[9] Likewise, PCIA argues that "a broad allocation contemplating virtually unlimited uses" will lead to "inefficient spectrum use, thereby thwarting the Commission's efforts to maximize availability of the recovered broadcast spectrum."[10] In addition to these comments focusing on the economic impact to bidders, the National Public Safety Telecommunications Council (NPSTC) focused its concern on interference to public safety systems caused by adjacent channel "high powered, constant carrier transmitters" that only can be eliminated by "reducing broadcast transmitter ERP, adding filtering to the broadcast transmitter and/or geographic isolation."[11] NPSTC ultimately recommends that "broadcast services should be removed entirely from 746-806 MHz" and that "this spectrum be put to better use in compatible land mobile applications."[12]

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[8] Comments of Motorola at 8.

[9] Comments of CTIA at 5.

[10] Comments of PCIA at 3, 4.

[11] Comments of NPSTC at 6.

[12] *Id.* at 7.

Few broadcast interests discussed this proposal. The joint comments of the NAB and MSTV do state that a "block" allocation of 36 MHz would preserve the opportunity to authorize broadband video use in this spectrum.[13] While it is not clear from these comments that the broadcast parties support the use of competitive bidding for the commercial allocation and would expect broadcast parties to participate in the mandated auctions, NAB and MSTV simply note that broadband video operations are expanding and that new spectrum should be allocated for such use.[14]

In Motorola's view, the FCC must prioritize its decision on the needs of the public safety community. While permitting full powered video broadcast services may further licensee flexibility, it is true that greater out-of-band emissions caused by broadcast transmitters will result in more cases of adjacent channel interference and limit the use of the adjacent channel frequencies. This must be avoided if the adjacent channel is allocated to public safety. Coupled with the resulting reductions in spectrum efficiency that would occur by allowing unpaired broadband video services to be co-mingled with two way systems[15], Motorola strongly urges the FCC to narrow the defined uses of the commercial allocation to fixed and mobile services.[16]

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[13] Comments of MSTV and NAB at 7.

[14] *Id.*

[15] *See* Comments of Motorola at 8.

[16] Motorola notes that Final Analysis, Inc. (Final Analysis) requests that the FCC allocate 21 MHz from the 746-806 MHz band for "Little LEO" mobile satellite use. Comments of Final Analysis at 3. Final Analysis bases this request on the "large demand for near-real time Little LEO applications such as automatic meter reading, asset tracking, vehicle messaging personal

The FCC Should Reject the Broadcast Proposal to Allocate 782-806 MHz (TV Channels 66-69) for Public Safety and Instead Allocate 764-776 and 794-806 MHz as Proposed

The NAB and MSTV filed comments opposing the FCC's initial proposal to allocate channels 63, 64 68 and 69 for public safety and instead recommended that a contiguous block of 24 MHz encompassing channels 66-69 would better serve public safety users.[17] The broadcasters claim that their proposal would 1) improve spectrum efficiency, 2) reduce interference to existing television operations, 3) increase flexibility for DTV operations and relocating LPTV stations and translators, and 4) increase the utility of the remaining 36 MHz in the 746-806 MHz band.[18] The broadcaster's comments note that, under the FCC's proposals, public safety services would have three "frontiers" (*i.e.,* adjacencies to commercial and/or broadcast operations) to protect and that reducing the number of adjacencies should reduce adjacent channel interference.[19]

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messaging and remote monitoring and supervisory control and data acquisition" and that reallocating a portion of the 746-806 MHz band "would make necessary spectrum available to Little LEO operators to develop commercial systems to meet the global demand for these services." *Id.* at 2. Final Analysis is apparently unaware that the *Balanced Budget Act of 1997* has already established the uses of this reallocated spectrum. Unless Final Analysis has changed its position with regard to spectrum auctions and now intends to compete with other commercial service providers for licenses, its request cannot comply with the current law. In any event, Motorola views the demand study submitted by Final Analysis supporting a 21 MHz allocation of spectrum as highly suspect particularly since the Little LEO service has existing spectrum allocations that are not fully licensed or loaded.

[17] Comments of MSTV and NAB at 4.

[18] *Id.*

[19] *Id.* at 3.

The broadcasters also characterize the FCC's proposals to "splinter" the public safety allocation into "small spectrum slivers" as inefficient and would deprive both public safety services and the commercial services in the remaining 36 MHz the flexibility to offer broadband or other spectrum-intensive services. The broadcasters quickly conclude that 24 MHz block of spectrum would provide public safety with the requisite level of separation between transmit and receive frequencies.

Motorola strongly believes that the FCC's original proposal to allocate public safety the spectrum now occupied by channels 63, 64, 68 and 69 is superior to that proposed by the broadcast interests. First and foremost, the FCC's proposal provides a consistent and maximum separation between base and mobile transmit frequencies across the entire band which simplifies the design and operation of portable and mobile radios. Reducing the separation to 12 MHz at operating frequencies near 800 MHz will impose additional costs on manufacturers which will be passed on to public safety users.[20] In the worst case, reduced separations will seriously affect the ability of manufacturers to offer duplex communication capabilities for portable/mobile operation. At best, reduced separations will require substantially more complex circuitry that will increase the physical size of the radios and well as limit battery life for portable units.[21]

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[20] The broadcaster's proposal would result in a 12 MHz separation between base and mobile transmit frequencies which is approximately 1.5 percent of the operating frequency. In contrast, the 45 MHz separation between base and mobile transmit frequencies in the 800 MHz public safety band is more than 5 percent of the operating frequency.

[21] Reducing the separations for the commercial allocation from the proposed 30 MHz to 18 MHz raises competitive issues as well. An 18 MHz transmit/receive separation will substantially reduce competitive opportunities for CMRS wireless telephone-type services. Commercial mobile radio operators seeking to compete against cellular radio, PCS and wide area SMR systems should not be technically disadvantaged in offering small lightweight units to potential subscribers.

Further, the broadcaster's proposal would result in increased intersystem interference potential at public safety base station sites. Providing public safety a contiguous block of spectrum where the base station transmit frequencies abut the mobile station transmit frequencies (i.e., the base station receive frequencies) could result in base station transmitters and receivers being collocated with as little as 12.5 kHz separation. The better solution is to allocate the adjacent frequencies to other services to minimize the likelihood of collocation interference[22]. Furthermore, the broadcast proposal would result in a long term increase in the environmental noise floor to the public safety allocation due to the combined effects of many nearby base station transmitters operating in frequencies immediately adjacent to base station receivers.

Finally, the broadcasters claim that a contiguous block of spectrum is needed to ensure that public safety agencies are not precluded from using wide band technologies that require more than 12 MHz of spectrum. During the many months that the PSWAC committee reviewed near and far term public safety communications needs, no such need was identified. While it is clear that this allocation will help meet the public safety needs for advanced high speed technologies and even video applications, Motorola believes that compression technologies and spectrum efficiency techniques will limit the maximum spectrum required for any particular application to less than a megahertz.[23]

In short, the broadcast proposal appears to be more in tune with the needs of the broadcast community than the needs of public safety. Allocating channels 63, 64, 68 and 69 for public safety use better serves public safety during the transition period -- those channels have the fewest NTSC incumbents -- as well as the long term after broadcast operations are relocated.

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[22] In other words, assign commercial base receive frequencies adjacent to public safety base receive frequencies.

[23] Indeed, even the compressed SDTV channels envisioned by the broadcast community would transmit standard definition video programming in less than 1 MHz.

In a related issue, ARINC filed comments raising the valid concern of protecting the Global Navigation Satellite Services (GNSS) [24] from potential interference that might be generated from excessive second harmonic emissions radiated by devices used in the 746-806 MHz band. ARINC states that "It would be prudent at this time early in the planning to develop standards which will provide sufficient out-of-band suppression for the second harmonic to protect operation of the GNSS in the band 1559-1610 MHz."[25]

Motorola understands the need to protect the GNSS navigational systems and looks forward to working this issue with the FCC and the aeronautical community in the forthcoming proceeding on service rules for this frequency band. Motorola notes, however, that the protection defined in the document RTCA/DO-235, "Assessment of Radio Frequency Interference Relevant to the GNSS" will be difficult to achieve without significant costs being borne by public safety users.[26] We note that the relevant study document indicates some disagreement between the MSS industry and the aviation representatives on whether the recommended interference criteria were in fact necessary to prevent interference, particularly

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[24] The GNSS is primarily comprised of the Global Positioning Satellite (GPS) and the Russian GLONASS satellite location system.

[25] Comments of ARINC at 5.

[26] The major difficulty will be in meeting the emissions requirements to protect the GLONASS system to -80 dBm. Accomplishing this requirement into mobile and portable units will be demanding from an engineering perspective. On the other hand, should the FCC adopt its proposal to allocate channels 63, 64, 68 and 69 to public safety, the GPS system would not be at risk since the second harmonic from frequencies on these channels will not fall into the GPS band. This will prove beneficial since the commercial allocation will not be available until at least 2001 giving the FCC and potential bidders time to fully understand the nature of the required protection.

with respect to the GLONASS system. Given the potential impact to public safety and commercial users, it may be appropriate for the FCC, land mobile, and aeronautical industries to review whether these levels are indeed appropriate.

Conclusion

Congress has instructed the FCC to proceed expeditiously in reallocating the 746-806 MHz band for public safety and commercial services. This action is the first of several that are necessary before this band can achieve its promise of offering important services for the American public. Thus, Motorola encourages the FCC to resolve quickly this phase of the proceeding and to direct its attention to the development of appropriate service rules and sharing criteria that will enable the band to be used to its maximum efficiency during the DTV transition.

Respectfully Submitted,

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